

REMARKS

Claims 41-50, 52-58, 60-74, 76-86, and 88-102 are pending in this application. By this Amendment, claims 41, 50, 52, 58, 74, 82, 86 and 102 are amended and claims 51, 59, 75, 87 and 103 are canceled. No new matter is added. In view of the foregoing, reconsideration and allowance are respectfully requested.

I. Rejection under 35 U.S.C. §112, second paragraph

Claims 50, 51, 58, 59, 74, 75, 86, 87, 102 and 103 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite. This rejection is respectfully traversed.

The cancellation of claims 51, 59, 75, 87 and 103 renders the rejection of these claims moot. Claims 50, 58, 74, 86 and 102 are amended to overcome the rejection. Applicants respectfully request withdrawal of the rejection of claims 50, 58, 74, 86 and 102.

II. Rejection under 35 U.S.C. §103(a)

Claims 41, 42, 50 and 52 are rejected under 35 U.S.C. §103(a) over Hiraishi et al. (JP-A-9-227286). This rejection is respectfully traversed.

Regarding independent claims 41 and 52, Applicants submit that the Office Action has failed to make a *prima facie* case of obviousness with regard to Applicants' slits as recited in claim 41 or distribution as recited in claim 52. Specifically, the Office Action fails to identify any acceptable suggestion or motivation, either in the reference or in the knowledge generally available to one of ordinary skill in the art, to modify the reference (i.e., why the skilled artisan would have been motivated to modify the apparatus of Hiraishi), as required by MPEP §§2142, 2143.

The Office Action, on page 4, asserts that one of ordinary skill in the art would have been motivated to modify Hiraishi in order to provide stable melting of a polycrystalline raw material held within a crucible, to reduce cost, and to suppress the installation space to the possible minimum extent. The Abstract of Hiraishi specifically states that the apparatus

provides stable melting of a polycrystalline raw material held within a crucible, reduces cost, and suppresses the installation space to the possible minimum extent. However, Hiraishi fails to provide any disclosure or suggestion with regard to using slits with different lengths to achieve this advantage or using slits of different lengths in order to overcome the problems presented in the structure of Hiraishi and solved by disclosing the structure recited in claims 41 and 52. See, for example, page 10, lines 9-27 and page 14, line 17 - page 15, line 9, of Applicants specification.

Hiraishi fails to disclose or suggest any reason for modifying their apparatus in order to create the features of claims 41 and 52. The apparatus in Hiraishi was designed to reduce the oxygen concentration of semi-conductor single crystals and provide stable melting of a polycrystalline raw material held within a crucible. In order to reduce the oxygen concentration of semi-conductor single crystals and provide stable melting of a polycrystalline raw material held within a crucible, Hiraishi provides a cylindrical heating element (5) having toric slits (6). The heating element (5) is divided into an upper heat generating section (5A) and a lower heat generating section (5B) by the toric slits (6). This design results in a heater that can change a heat generating distribution of the heat generating part in a vertical direction. By changing the heat generating distribution of the heat generating part in a vertical direction, the oxygen concentration of a semi-conductor single crystal is reduced and stable melting of a polycrystalline raw material within a crucible is provided. See, for example, the Abstract, the "Solution," and paragraphs [0007]-[0010] of Hiraishi.

On the other hand, the apparatus of the present invention is designed to increase the growing rate of a single crystal. This issue was not recognized by Hiraishi and Hiraishi fails to suggest structure that addresses this issue.

The present invention solves the abovementioned problem by providing a heater that can change a heat generating distribution of the heat generating part in a circumferential direction. Accordingly, because the issue was not recognized in Hiraishi, it would not have been obvious to one of ordinary skill in the art to have modified Hiraishi to include slits of different lengths as recited in claim 41 or a graphite heater wherein a heat generating distribution of the heat generating part is such that a high temperature part and a low temperature part are periodically distributed in a circumferential direction, as recited in claim 52.

Hiraishi's heater can change a heat generated distribution of the heat generating part in "a vertical direction," however, it cannot change a heat generating distribution of the heat generating part in "a circumferential direction."

Conventional heaters including Hiraishi's heater have been designed so that a heat generating distribution of the heat generating part is made uniform over "a circumferential direction."

As previously understood by one of ordinary skill in the art, a heater should have a cylinder form and should be designed so that a heat generating distribution of the heat generating part is made uniform over "a circumferential direction," for a crystal with a concentric circle form. Therefore, one of ordinary skill in the art would change a heat generating distribution in "a vertical direction" as Hiraishi's heater, however, one of ordinary skill in the art would not change a heat generating distribution in "a circumferential direction."

Furthermore, a means of changing a heat generating distribution of the heat generating part in "a circumferential direction" is not described or suggested at all in Hiraishi. Against that, heat generating distribution in "a circumferential direction" in the present invention, breaking conventional knowledge wherein a heat generating distribution of the heat

generating part is made uniform over "a circumferential direction." Accordingly, even one of ordinary skill in the art cannot reach the present invention from Hiraishi.

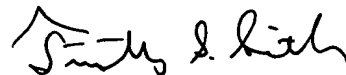
Because there is no suggestion or motivation, either in the Hiraishi or in the knowledge generally available to one of ordinary skill in the art, withdrawal of the rejection is respectfully requested.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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